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Risk and Protective Factors associated with Bullying among Vermont Students

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ABSTRACT

Background: Recent research has linked depressive episodes and behavior to bullying victimization, adding to a decade of research associating bullying victimization with multiple risk and protective factors. **Objective:** We aimed to determine how risk and protective factors differ among Vermont high school students who are bullied electronically as compared to in-person. **Methods**: This study was a cross-sectional analysis and applied descriptive and logistic regression on the 2015 Vermont Youth Risk Behavior Survey (n=20,013). **Results**: We found that students who reported depression, suicide attempts, or physical fighting were more likely to report both in-person and electronic bullying victimization, compared to those who only reported one form of bullying or those who did not report bullying at all. Additionally, students who were bullied and reported feeling disengaged within their community were less likely to report depression, suicide attempts, and physical violence than students who reported community engagement. **Conclusions:** Students who experienced both in-person and electronic bullying were associated with higher levels of depression, suicide attempts, and physical violence. While students who were disengaged within their community reported higher levels of bullying. Other risk factors that may have contributed to this association should be explored further. The relationship between the risk and protective factors associated with bullying and community engagement have important implications for public health in Vermont.

INTRODUCTION

According to the Vermont Youth Risk Behavior Survey (YRBS), 46% of high school students reported bullying in school and 16% reported electronic bullying.[1] The Center for Disease Control and Prevention defines electronic bullying in the YRBS as "being bullied through e-mail, chat rooms, instant messaging, websites, or texting."[2] Nationwide, 20.2% of students reported being bullied in school and 15.5% reported electronic bullying, which are both statistically lower than Vermont.[2]

This study utilized the 2015 Vermont High School YRBS data to analyze the associations between risk and protective factors and in-school and electronic bullying. Research suggests that risk factors associated with bullying or bullying victimization are dependent on whether students report violence or sexual violence; are sexually active; suffer from weight related issues; engage in excessive screen time; experiment with drugs, alcohol and/or tobacco; practice self-harm; have depressive symptoms or suicidal ideation and struggle with gender identity, unhealthy body perception, poor eating habits, and socioeconomic status.[3-5] In addition, research suggests that protective factors impact in-person and electronic bullying reports among students who participate in the YRBS. Protective factors include parental involvement, extracurricular activities, academic achievement, community and school connectedness as well as physical activity.[3,6] The purpose of this study was to develop a better understanding of how risk and protective factors differ among students who were bullied electronically as compared to students who were bullied in-person within Vermont.

METHODS

We performed a cross-sectional analysis of Vermont statewide Youth Risk Behavior Survey (YRBS) data.[7] The analysis used survey data collected in 2015 from 20,013 high school students within Vermont.[8] Participation in this survey was voluntary and limited to public schools. The response rate within Vermont high schools was 77% in 2015, therefore it is expected that the results are generalized to Vermont youth, including those from rural and urban areas[8]. Only participants with missing data or who answered "not sure" were excluded from the analysis, all other participants were included.

Outcome variables of in-person and electronic bullying were asked separately. In-person bullying was an ordinal question with response options of the number of days bullied, and electronic bullying was represented by a dichotomized (yes/no) question. Hypothesized predictor variables included physical fights, suicide attempts, depression and level of community connectedness.

YRBS questions were both dichotomized and ordinal, and ordinal variables were dichotomized to allow for easier comparison of the questions. An example of this is: Q20: "During the past 12 months, how many times were you in a physical fight?" A: 0 times - coded as a 0; 1 - 12 or more times coded as a 1. Correlational analyses were performed to determine the correlation (Pearson's R) of our predictor and outcome variables.

We performed preliminary analyses to identify the demographic covariates captured in the YRBS, including sex, sexual identity, age, grade-level, race, and mother's education level. Additionally, we ran multiple logistic regression models, controlling for the covariates, to model the association between risk and protective factors, and bullying groups. These models were run on the entire group and then on two sub groups – those who answered "yes" to community engagement, and those who answered "no." Descriptive statistics and frequency models were reported as well.

Data from the target survey years were stored and managed in both SharePoint (encrypted and password protected behind the UVM Firewall), R studio and SPSS [9,10]. This project has been reviewed and accepted by the University of Vermont, Office of Research Protections under the Instructor's Assurance process.

RESULTS

Participants

This study consisted of high school students from schools across Vermont, aged 12 – 18 with a mean age of 15.91 (SD=1.23 years). Males comprised 49.9% of the sample, and females 48.7%. Most participants identified as white (81.9%), followed by multiracial (3.9%), Asian (3%) and Black (2.3%). Additionally, 93.1% identified as non-Hispanic or Latino. Students were distributed evenly across 9^{th} – 12^{th} grade. 0.3% of the sample was "ungraded". Also, 33% of students reported their mother completed college, 18.8% reported their mother completed high school, 18.2% reported their mother completed a higher than college degree, and 8.9%

reported that they were "not sure". There were less than 5% missing data fields across all demographic questions.

Descriptive statistics were performed to observe the number of individuals in each outcome group (never bullied, bullied in-person only, bullied electronically only, and bullied both in-person and electronically). This is shown in Table 1.

Table 1: Demographic adherence to each outcome group

	Never Bullied (%)	Bullied in Person only (%)	Bullied Electronically Only (%)	Bullied both in-person and Electronically (%)	Total
Sex					
Male	9118 (75.1)	1295 (10.7)	1036 (8.5)	693 (5.7)	12142
Female	7808 (54.6)	2399 (16.8)	2392 (16.7)	1704 (11.9)	14303
Grade					
9th	4341 (58.2)	1253 (16.8)	1086 (14.6)	783 (10.5)	7463
10th	4538 (63.2)	1023 (14.2)	956 (13.3)	667 (9.3)	7184
11th	4322 (66.5)	825 (12.7)	807 (12.4)	546 (8.4)	6500
12th	3732 (70.8)	583 (11.1)	568 (10.8)	385 (7.3)	5268
Ungraded or Other Grade	36 (28.6)	36 (28.6)	28 (22.2)	26 (20.6)	126
Race					
White or Caucasian	14146 (64.6)	2991 (13.7)	2814 (12.8)	1950 (8.9)	21901
Black or African American	413 (72.7)	62 (10.9)	56 (9.9)	37 (8.9)	568
Asian	572 (78.5)	63 (8.6)	57 (7.8)	37 (6.5)	729
Other	1452 (53.4)	499 (18.3)	442 (16.2)	328 (12.1)	2721
Ethnicity					
Non-Hispanic or Latino	16060 (64.6)	3406 (13.7)	3182 (12.8)	2208 (8.9)	24856
Hispanic or Latino	688 (53.1)	236 (18.2)	212 (16.3)	159 (12.2)	1295
Mother's Education Level					
Completed grade school or less	224 (47.3)	97 (20.5)	83 (17.5)	70 (14.8)	474
Attended some high school	877 (49.6)	334 (18.9)	307 (17.4)	249 (14.1)	1767
Completed high school	3154 (60.1)	781 (14.9)	767 (14.6)	547 (10.4)	5249
Attended some college	2188 (60.2)	551 (15.1)	536 (14.7)	360 (9.9)	3635
Completed college	5849 (69.8)	1027 (12.3)	905 (10.8)	593 (7.1)	8374
Completed graduate or professional school after college	3278 (70.9)	534 (11.5)	491 (10.6)	323 (7)	4626
Not sure	1436 (57.8)	412 (16.6)	364 (14.6)	273 (11)	2485

Logistic Regression Analysis

Logistic regression modeling revealed that students who reported depression, suicide attempts or physical fighting were more likely to report all types of bullying. Students who did not report community engagement were more likely to report all types of bullying. This is displayed in Table 2.

When modeling bullying as an independent variable, the dose relationship was apparent between students who reported one type of bullying versus those who reported both types of bullying, When these models were run on the two subgroups, those who answered “no” to community engagement and those who answered “yes”, the odds of bullying being associated with the risk factors were lower in the “no” group than the “yes” group. The multivariate logistic regressions are detailed in Table 2.

Table 2: Adjusted Odds Ratios for Bullying Types

	Adjusted Odds Ratios for Bullying Types by Depression, Suicide Attempt, Physical Fight and Community Engagement in Vermont High School Students*				*Adjusted* Odds Ratios for Bullying** Types by Depression, Suicide Attempt, Physical Fight in Samples Stratified by Community Engagement*			
	Bullying as a Dependent Variable		**Bullying as an Independent Variable**		**Answered "Yes" to Community Engagement**		**Answered "No" to Community Engagement**	
	E.g. Students who were bullied electronically had 4.32 higher odds of being depressed.		*E.g. Students who were depressed had 3.23 higher odds of being bullied electronically.*					
Depressed	**Odds Ratio**	**CI**	**Odds Ratio**	**CI**	**Odds Ratio**	**CI**	**Odds Ratio**	**CI**
Bullied Electronically	4.32	3.92-5.29 ***	3.23	2.56-4.06 ***	4.56	3.92-5.29 ***	3.21	2.8 - 3.87 ***
Bullied In-Person	3.61	2.98 4.01 ***	3.18	2.46-4.07 ***	3.46	2.98-4.01 ***	2.65	2.27 - 3.1 ***
Both Types of Bullying	4.54	3.80-5.43 ***	7.62	6.53-8.91 ***	4.54	3.8 - 5.43 ***	3.49	2.91 - 4.2 ***
Suicide Attempt								
Bullied Electronically	5.11	4.46-5.87 ***	2.10	2.01-2.23 ***	5.04	3.64-6.96 ***	3.34	2.83-4.25 ***
Bullied In-Person	5.10	4.45-5.85 ***	3.40	2.96-3.92 ***	5.2	3.64-6.96 ***	3.47	2.72 - 4.1 ***
Both Types of Bullying	5.62	4.87-6.47 ***	5.49	4.90-6.07 ***	5.44	3.8 - 7.01 ***	3.89	3.17-4.79 ***
Physical Fight								
Bullied Electronically	3.43	3.12-3.78 ***	2.74	2.38-3.15 ***	3.36	2.83-3.96 ***	3.34	2.8 - 3.79 ***
Bullied In-Person	3.62	3.3 - 3.96 ***	2.31	1.95-2.72 ***	3.67	3.14 - 4.3 ***	3.28	2.77 - 3.9 ***
Both Types of Bullying	3.95	3.55-4.39 ***	4.86	4.36-5.42 ***	4.14	3.04-5.03 ***	3.78	3.15-4.56 ***
Community Engagement⁺								
Bullied Electronically	3.09	2.83-3.96 ***	2.41	2.07-2.81 ***				
Bullied In-Person	2.97	3.14-4.30 ***	2.11	1.78-2.50 ***				
Both Types of Bullying	3.25	3.04-5.03 ***	3.97	3.52-4.47 ***				

* Adjusted models controlling for grade, sex, sexual preference, race and mother's education level.

**Bullying as a dependent variable

***P<0.001

⁺ Community engagement is releveled so reference variable is "Yes"

DISCUSSION

In a representative sample of Vermont adolescents aged 12-18, this study found that females reported a higher percentage of in-person (16.8% vs. 10.7%), electronic (16.7% vs. 8.5%) and simultaneous forms of bullying (11.9% vs 5.7%) than males reported. As high school grade increased, the percentage of each student reporting all forms of bullying decreased. Those with an ethnicity classified as "other" in the YRBS reported a higher percentage of bullying in all forms. Adolescents with mothers who completed some grade school or less, or attended some high school, reported higher percentages of bullying in all forms.

Several studies have shown that females reported higher rates of all types of bullying, and as student grade level increases, reports of bullying of all forms decreased.[1-4] Research has also shown that those who reported depression, suicide attempts and physical violence have a higher likelihood of reporting bullying.[3,4] This relationship was seen in this study as well. When bullying was modeled as an independent variable, the odds of depression, suicide attempt and physical fighting doubled in those experiencing both forms of bullying. Those who reported "no" to community engagement reported higher rates of all forms of bullying, which aligns with previous research showing community engagement to be a protective factor for suicide.[11] When the data were stratified for community connectedness, those who reported "no" to community connectedness and reported "yes" to bullying were less likely to report depression, suicide attempts, and physical violence than those reported "yes" to both. This suggested other factors may contribute to their reporting of bullying. Further studies are needed to explore the relationship of varying levels of community connectedness among students who reported depression, suicide attempt and physical violence.

Respondent bias among YRBS participants is possible within this study, specifically with recall. The Vermont survey addresses bias by providing a safe survey environment and removes inconsistent responses to produce data that is consistent over time and comparable to health outcome data.[12] Additional limitations include the validity of the data as it only considers "in-school" students and the ability to generalize the data given Vermont's relatively small, rural and predominately white demographic.[12]

PUBLIC HEALTH IMPLICATIONS

The relationship between the risk and protective factors associated with bullying and community connectedness have important implications for public health in Vermont. Further work needs to be done to foster a greater sense of community among high school students and to better understand these associations. In addition, the results from the demographic analyses and logistic regressions suggest a need for more targeted mental health interventions among Vermont high school students to effectively support those at risk.

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